

This Page Is Inserted by IFW Operations
and is not a part of the Official Record

BEST AVAILABLE IMAGES

Defective images within this document are accurate representations of the original documents submitted by the applicant.

Defects in the images may include (but are not limited to):

- BLACK BORDERS
- TEXT CUT OFF AT TOP, BOTTOM OR SIDES
- FADED TEXT
- ILLEGIBLE TEXT
- SKEWED/SLANTED IMAGES
- COLORED PHOTOS
- BLACK OR VERY BLACK AND WHITE DARK PHOTOS
- GRAY SCALE DOCUMENTS

IMAGES ARE BEST AVAILABLE COPY.

As rescanning documents *will not* correct images,
please do not report the images to the
Image Problem Mailbox.

(19)



Europäisches Patentamt
European Patent Office
Office européen des brevets

(11)

EP 0 985 396 A2



(12)

EUROPEAN PATENT APPLICATION

(43) Date of publication:
15.03.2000 Bulletin 2000/11

(51) Int Cl.7: A61F 13/15

(21) Application number: 99307134.9

(22) Date of filing: 08.09.1999

(84) Designated Contracting States:
AT BE CH CY DE DK ES FI FR GB GR IE IT LI LU
MC NL PT SE
Designated Extension States:
AL LT LV MK RO SI

(30) Priority: 08.09.1998 JP 25363498

(71) Applicant: UNI-CHARM CORPORATION
Kawane-ehi Ehime-ken (JP)

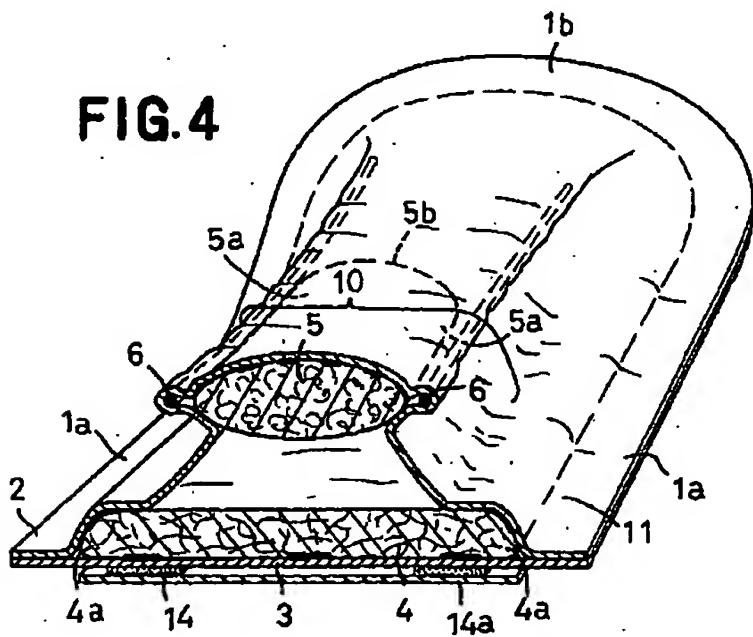
(72) Inventor: Mizutani, Satoshi, c/o Technical Center
Mitoyo-gun, Kanagawa-ken 769-1602 (JP)
(74) Representative: Parry, Christopher Stephen
Saunders & Doleymore,
9 Rickmansworth Road
Watford, Herts. WD1 7HE (GB)

(54) Sanitary napkin

(57) A sanitary napkin 1 includes a liquid-pervious topsheet 2, a liquid-impervious backsheet 3 and a liquid-absorbent core 4 disposed therebetween. The topsheet 2 extends to transversely opposite side edges 1a of the napkin 1 with interposition of pleats 10a, along which side edges 1a the topsheet 2 is bonded to the backsheet 3. The core includes a lower absorbent core 4 and an

upper absorbent core 5. The pleats 10a lie between transversely opposite side edges 4a of the lower absorbent core 4 and transversely opposite side edges 5a of the upper absorbent core 5. The topsheet 2 are provided along the opposite side edge of the upper absorbent core 5 with elasticity being effective longitudinally of the napkin 1.

FIG.4



EP 0 985 396 A2

Description

[0001] This invention relates to a sanitary napkin absorption and containment of menstrual discharge.

[0002] Japanese Utility Model Application Disclosure Gazette (Kokai) No. Hei7-33315 discloses a sanitary napkin consisting of upper and lower napkins each comprising a liquid-absorbent core covered with a liquid-permeable sheet. The upper napkin having a longitudinal dimension smaller than that of the lower napkin lies on a middle region of the lower napkin. A pair of elastic members extend longitudinally along transversely opposite side edges of the upper napkin beyond longitudinally opposite ends of the upper napkin and are fixed under tension to longitudinally opposite ends of the lower napkin at respective ends of these elastic members. The upper and lower napkins can relatively move without being restricted by each other within a considerably wide range.

[0003] In the known sanitary napkin, a lower surface of the upper napkin normally remains in contact with the upper surface of the lower napkin and operate as if these two napkins are assembled in a single napkin. Specifically, the liquid-permeable sheet covering the upper napkin is placed upon the liquid-permeable sheet covering the lower napkin. Such situation may obstruct a rapid transfer of menstrual discharge from the upper napkin to the lower napkin. In consequence, there is any apprehension that a portion of menstrual discharge might leak sideways before it transfers to the lower napkin especially when a large quantity of menstrual discharge is discharged.

[0004] In view of the problem as has been described above, it is an object of this invention to provide a sanitary napkin including upper and lower liquid-absorbent core but improved so that menstrual discharge can rapidly transfer from the upper absorbent core to the lower absorbent core and thereby any apprehensive leakage of menstrual discharge can be avoided.

[0005] According to this invention, there is provided a sanitary napkin including a liquid-permeable topsheet, a liquid-impermeable backsheet and a liquid-absorbent core disposed between the topsheet and the backsheet, the sanitary napkin being contoured by a pair of opposite side edges extending longitudinally of the napkin and a pair of opposite ends extending between the pair of opposite side edges, wherein: the topsheet is dimensioned to have a width larger than that of the backsheet and transversely opposite sides of the topsheet is folded back inwardly of the napkin along a pair of folding lines extending longitudinally of the napkin and the folded portions are further folded outwardly of the napkin so as to form a pair of pleats and extend from the pleats to the respective side edges of the napkin along which the topsheet is bonded to the backsheet; the absorbent core includes a lower absorbent core and an upper absorbent core, the lower absorbent core is placed on an inner surface of the backsheet and extends between the opposite side edges and between longitudinally opposite ends of

the napkin; the upper absorbent core is dimensioned to be shorter than the lower absorbent core and separately placed upon an inner surface of the lower absorbent core; the upper absorbent core is bonded to an inner surface of the topsheet so that the upper absorbent core is spaced from the opposite ends of the napkin and the pleats lie between the transversely opposite side edges of the lower absorbent core and the transversely opposite side edges of the upper absorbent core; and at least portions of said topsheet are provided along the opposite side edges of the upper absorbent core with elasticity being effective longitudinally of the napkin.

[0006] According to one embodiment of this invention, the upper absorbent core lies to one of the longitudinally opposite ends of the napkin.

[0007] According to another embodiment of this invention, the elasticity of the topsheet is given by elastic members in the form of threads, ribbons or sheets.

[0008] According to still another embodiment of this invention, the elasticity of the topsheet is given by an elastic sheet used as the topsheet being bonded under tension in the longitudinal direction.

[0009] According to further another embodiment of this invention, the maximum dimension by which the upper absorbent core is spaced from the lower absorbent core in response to contraction of the topsheet is in a range of 5 ~ 50 mm.

[0010] According to an additional embodiment of this invention, a plurality of said pleats are formed on both sides of the upper absorbent core, respectively.

[0011] Embodiments of the Invention are described below, with reference to the accompanying drawings, in which:

[0012] Fig. 1 is a plan view showing a partially cut away sanitary napkin according to the invention; Fig. 2 is a sectional view taken along a line A-A in Fig. 1; Fig. 3 is a perspective view showing the partially cut away napkin with its elastic members contracting; Fig. 4 is a perspective view of the napkin inclusive of its section taken along a line B-B in Fig. 3; and Fig. 5 is a sectional view taken along a line C-C in Fig. 3.

[0013] Fig. 1 is a perspective view showing a partially cut away sanitary napkin 1 and Fig. 2 is a sectional view taken along a line A-A in Fig. 1. A sanitary napkin 1 is elongate and comprises a liquid-permeable topsheet 2, a liquid-impermeable backsheet 3, a liquid-lower absorbent core 4 and a liquid-upper absorbent core 5 overlying the lower absorbent core 4. The sanitary napkin 1 is contoured by a pair of transversely opposite side edges 1a extending longitudinally and a pair of longitudinally op-

posite ends 1b extending between the pair of side edges 1a.

[0014] A portion 10 of the topsheet 2 to cover a transversely middle region of the napkin 1 is folded back inwardly of the napkin 1 along a pair of folding lines 12 extending in parallel to the respective side edges 1a of the napkin 1. Then the portions folded in this manner are folded outwardly of the napkin 1 so as to form a pair of pleats 10a and thereafter extend to the respective side edges 1a of the napkin 1, along which the topsheet 2 is bonded to the backsheet 3. As will be understood from such manner in which the topsheet 2 covers the transversely middle region of the napkin 1, the topsheet 2 is dimensioned to have a width considerably larger than that of the backsheet 3.

[0015] The backsheet 3 is substantially flat and is formed on its lower surface with a pair of adhesive fastening zones 14 used to fasten the napkin 1 to an undergarment worn by a napkin wearer and protectively covered with respective release sheets 14a.

[0016] The lower absorbent core 4 is placed on an inner surface of the backsheet 3 and extends between the side edges 1a and between the longitudinally opposite ends 1b. An upper surface of the lower absorbent core 4 has its transversely middle region 4c placed in contact with a lower surface of the upper absorbent core 5. Transversely opposite side edges 4a of the lower absorbent core 4 are bonded to a lower surface of the topsheet 2 by means of adhesive agent 21. Intermediate regions 4d defined between the middle region 4c and the respective side edges 4a are not bonded to the topsheet 2. Both the middle region 4c and the intermediate regions 4d are not bonded to the upper absorbent core 5 as well as to the topsheet 2 so that the regions 4c, 4d can be freely spaced from the upper absorbent core 5 and the topsheet 2. The longitudinally opposite ends 4b of the lower core 4 are bonded to an inner surface of the topsheet 2 at locations slightly inside the longitudinally opposite ends 1b of the napkin 1. A lower surface of the lower absorbent core 4 is bonded to an inner surface of the backsheet 3 by means of adhesive agent 21.

[0017] The upper absorbent core 5 is smaller than the lower absorbent core 4 in length as well as in width. Preferably, the upper absorbent core 5 is formed so that its thickness gradually decreases from the middle region toward the side edges and separably placed upon the inner surface of the lower absorbent core 4. Longitudinally opposite ends 5b of the upper absorbent core 5 lie inside the respective side edges 4b of the lower absorbent core 4 and are spaced from the respective ends 1b of the napkin 1 by a predetermined distance. Preferably, the upper absorbent core 5 lies to the front end of the napkin 1 during actual use of the napkin 1. The upper surface of the upper absorbent core 5 defined between its transversely opposite side edges 5a is bonded to the inner surface of the portion 10 of the topsheet 2 to cover the transversely middle region of the napkin 1 by means of adhesive agent 21.

[0018] Thread-like elastic members 6 extending between the longitudinally opposite ends 1b of the napkin 1 are secured under tension to the inner surface of the topsheet 2 along the side edges of the upper absorbent core 5 by means of adhesive agent (not shown). These elastic members 6 having a contractile force sufficient to longitudinally curve the napkin 1 convexly downward as the elastic members 6 contract. Elongation percentage of these elastic members 6 is 20 ~ 200 %. It should be understood that the thread-like elastic members 6 may be replaced by ribbon-like elastic members.

[0019] Portions of the topsheet 2 extending longitudinally along the respective elastic members 6 further extend outward beyond the side edges of the upper absorbent core 5. It is possible to provide also along respective free edges of these extensions with the elastic members 6 and thereby to improve a side flap function of these extensions tending to rise toward the wearer's skin.

[0020] Portions of the topsheet 2 and the backsheet 3 extending outward beyond a peripheral edge of the lower absorbent core 4 and placed upon each other are bonded together by means of adhesive agent or heat-sealing treatment to define the transversely opposite side edges 1a and the longitudinally opposite ends 1b of the napkin 1. During actual use of the napkin 1, the lower surface of the upper core 5 is normally in contact with the upper surface of the lower absorbent core 4, the adhesive fastening zones 14 of the backsheet 3 are fastened to an inner surface of the undergarment worn by the napkin wearer, and the upper surface of the upper absorbent core 5 is placed against the wearer's pudendum with interposition of the topsheet 2. Menstrual discharge once absorbed by the upper absorbent core 5 transfers to the lower absorbent core 4 so far as the lower absorbent core 4 is maintained in contact with the upper absorbent core 5.

[0021] Fig. 3 is a perspective view showing the partially cut away napkin 1 with the elastic members 6 contracting and Fig. 4 is a perspective view of the napkin 1 inclusive of a section taken along a line B-B in Fig. 3. Supposed that the napkin 1 is still not put on the wearer's body, the napkin 1 is longitudinally curved convexly downward as the elastic members 6 contract against a rigidity of the lower absorbent core 4 and, in consequence, the upper absorbent core 5 is spaced upward from the lower absorbent core 4. Thus, the pleats 10a of the topsheet 2 vertically spread between the upper absorbent core 5 and the lower absorbent core 4. Contraction of the elastic members 6 causes the topsheet 2 to be formed with gathers along its zones in which the elastic members 6 are bonded to the topsheet 2.

[0022] Fig. 5 is a sectional view taken along a line C-C in Fig. 3 as shown, the upper absorbent core 5 extends practically in a horizontal direction longitudinally of a napkin 1. The maximum dimension as measured from the upper surface of the lower absorbent core 4 to the lower surface of the upper absorbent core 5 is pref-

erably in a range of 5 ~ 50 mm. Even if the undergarment slip down and the napkin 1 is moved away from the wearer's body, the upper absorbent core 5 is spaced from the lower absorbent core 4 to remain in contact with the wearer's pudendum so that menstrual discharge may be rapidly absorbed. In this manner, the napkin 1 is free from any apprehension that undesirable leakage of menstrual discharge might readily occur.

[0023] In a specific embodiment of the napkin 1 according to this invention, both the upper absorbent core 5 and the lower absorbent core 4 are formed by compressing fluff pulp or a mixture of fluff pulp and superabsorptive polymer particles and covering it with a water-absorbent sheet 13 such as tissue paper.

[0024] The elastic member 6 may be made of synthetic rubber, natural rubber, a composite material such as a film combined with synthetic rubber, a spun bond nonwoven fabric or a melt blown nonwoven fabric both comprising synthetic rubber as its principal component or a nonwoven fabric to which a suitable elastic material is secured under tension, or the like. In the case of the elastic member 6 comprising a nonwoven fabric, this nonwoven fabric is secured under tension to the inner surface of the topsheet 2 between the longitudinally opposite ends 5b of the upper absorbent core 5 and the longitudinally opposite ends 1b of the napkin 1. While the elastic members 6 are shown to extend between the longitudinally opposite ends 1b, it is also possible to arrange so that these elastic members 6 extend only between the longitudinally opposite ends 5b of the upper absorbent core 5 and the longitudinally opposite ends 1b of the napkin 1, respectively.

[0025] Stock material useful for the topsheet 2 includes a hydrophobic nonwoven fabric, a hydrophobic nonwoven fabric treated with hydrophiling agent or a hydrophilic nonwoven fabric made of fibers mixed with hydrophiling agent. A water-permeable sheet having an elasticity also can be used as stock material for the topsheet 2. In this case, such elastic sheet may be secured, under tension between the longitudinally opposite ends 1b of the napkin 1, to the portions of the backsheet 3 extending outward beyond the peripheral edge of the lower absorbent core 4. In this manner, use of the elastic members 6 can be eliminated. It is also possible to use a liquid-permeable apertured film of thermoplastic synthetic resin in the place of the nonwoven fabric and such film includes an elastic film. No matter what type of stock material is used, the topsheet 2 may be formed particularly in its region covering the upper absorbent core 5 with a plurality of and/or large-diametered liquid-permeous apertures.

[0026] With the sanitary napkin according to this invention, undesirable leakage of menstrual discharge can be effectively avoided even when the undergarment worn by the napkin wearer slips down and consequently the napkin adhesively fastened to the inner surface of the undergarment crotch region moves away from the wearer's body, because the upper absorbent core is

spaced upward from the lower absorbent core so as to remain in contact with the wearer's body. The upper absorbent core is free to move relatively to the lower absorbent core in a sufficiently wide range to ensure that

5 the upper absorbent core can remain in contact with the wearer's body and thereby avoid undesirable leakage of menstrual discharge even when the lower absorbent core moves together with the undergarment back and forth or rightward and leftward relative to the wearer's body.

[0027] In the normal state of this napkin, the upper and lower absorbent cores are in direct contact with each other so that transfer of menstrual discharge from the upper absorbent core to the lower absorbent core can rapidly occur.

Claims

20 1. A sanitary napkin including a liquid-permeable topsheet, a liquid-impermeable backsheet and a liquid-absorbent core disposed between the topsheet and the backsheet; said sanitary napkin being contoured by a pair of opposite side edges extending longitudinally of said napkin and a pair of opposite ends extending between said pair of opposite side edges, wherein:

25 said topsheet is dimensioned to have a width larger than that of said backsheet and said topsheet is folded back inwardly of said napkin along a pair of folding lines extending longitudinally of said napkin and the folded portions are further folded outwardly of said napkin so as to form a pair of pleats and extend from the pleats to the respective side edges of said napkin along which said topsheet is bonded to said backsheet;

30 said absorbent core includes a lower absorbent core and an upper absorbent core, said lower absorbent core is placed on an inner surface of said backsheet and extends between said opposite side edges and between said opposite ends of said napkin;

35 said upper absorbent core is dimensioned to be shorter than said lower absorbent core and separately placed upon an inner surface of said lower absorbent core;

40 said upper absorbent core is bonded to an inner surface of said topsheet so that said upper absorbent core is spaced from the opposite ends of said napkin and said pleats lie between the transversely opposite side edges of said lower absorbent core and the transversely opposite side edges of said upper absorbent core; and at least portions of said topsheet are provided along said opposite side edges of said upper absorbent core with elasticity being effective

longitudinally of said napkin.

2. A sanitary napkin according to Claim 1, wherein
said upper absorbent core lies to one of said oppo-
site ends of said napkin. 5
3. A sanitary napkin according to Claim 1, wherein
said elasticity of said topsheet is given by elastic
members in the form of threads, ribbons or sheets. 10
4. A sanitary napkin according to Claim 1, wherein
said elasticity of said topsheet is given by an elastic
sheet used as said topsheet being bonded under
tension in the longitudinal direction of said back-
sheet. 15
5. A sanitary napkin according to Claim 1, wherein the
maximum dimension by which said upper absorb-
ent core is spaced from said lower absorbent core
in response to contraction of said topsheet is in a 20
6. A sanitary napkin according to Claim 1, wherein a
plurality of said pleats are formed on both sides of
said upper absorbent core, respectively. 25

30

35

40

45

50

55

FIG. I

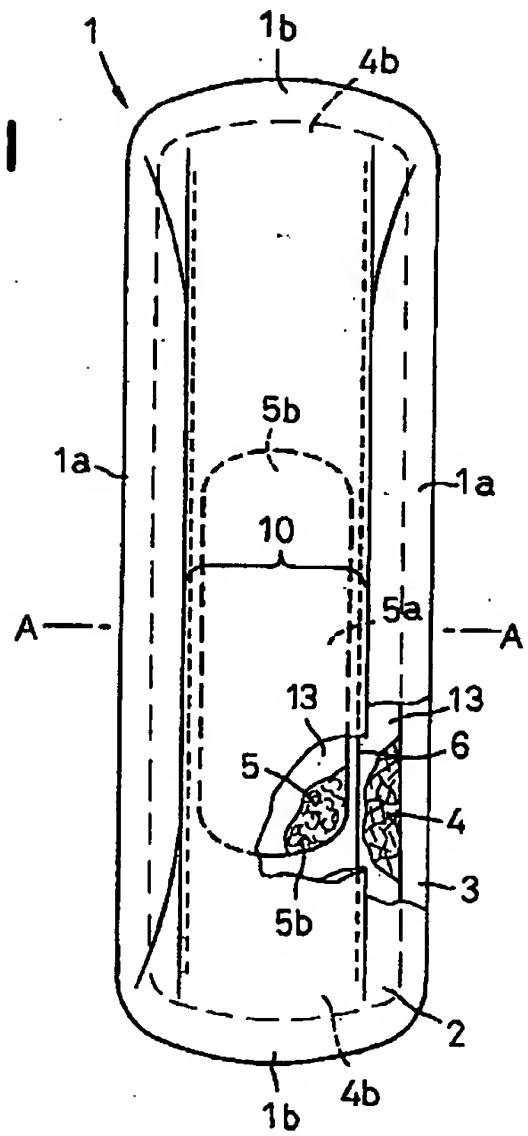


FIG.2

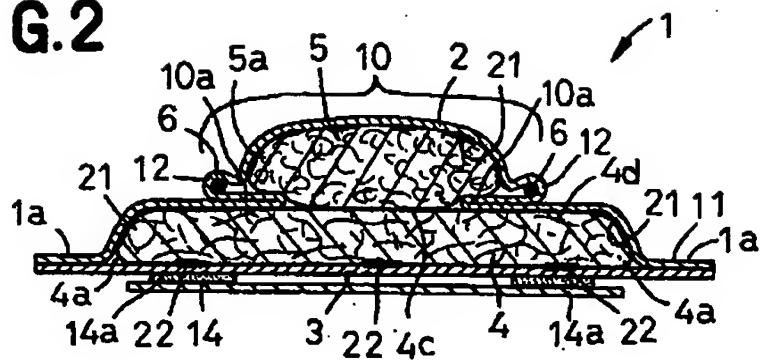


FIG.4

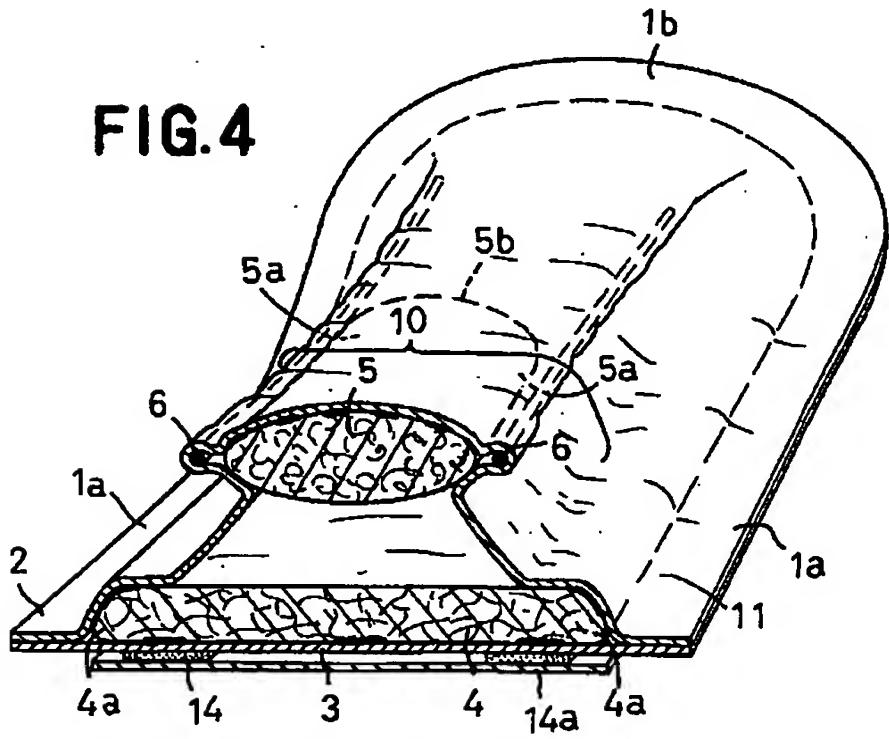


FIG.3

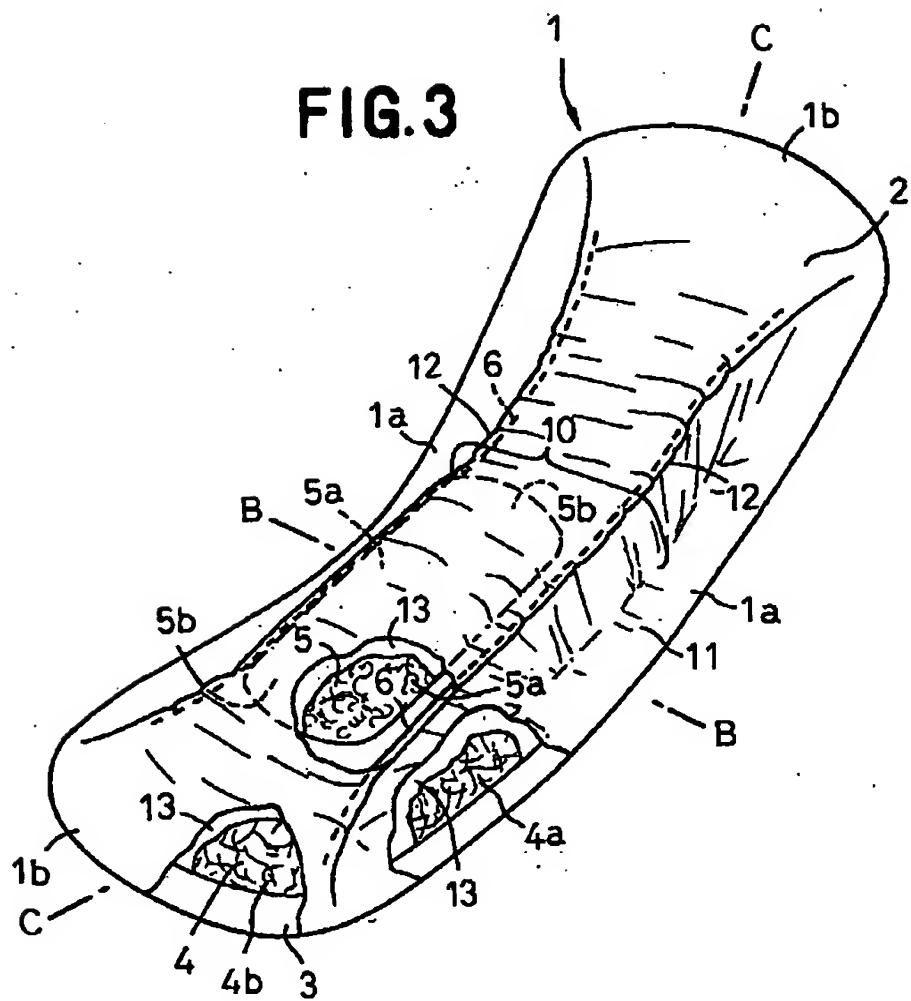
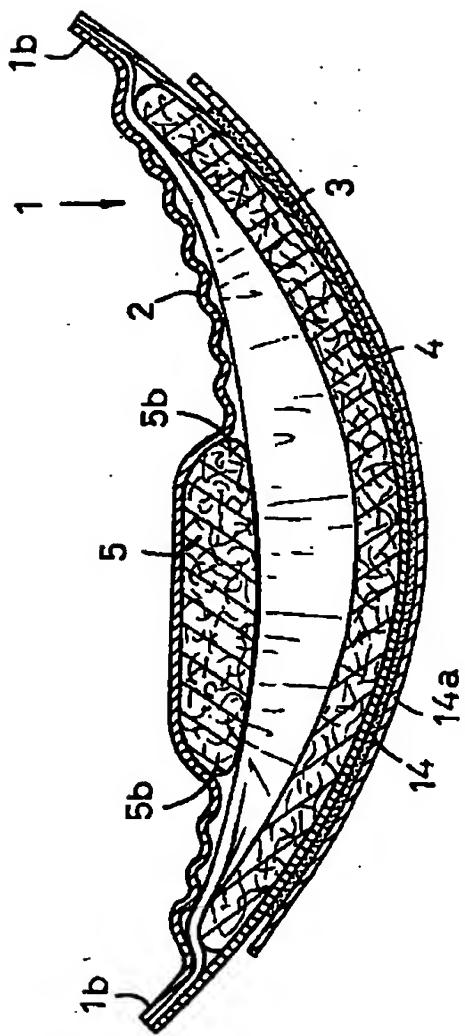


FIG. 5



(19)



Europäisches Patentamt

European Patent Office

Office européen des brevets

(11)



EP 0 985 396 A3

(12)

EUROPEAN PATENT APPLICATION

(88) Date of publication A3:
02.01.2002 Bulletin 2002/01

(51) Int CL⁷: A61F 13/15

(43) Date of publication A2:
15.03.2000 Bulletin 2000/11

(21) Application number: 98307134.9

(22) Date of filing: 08.09.1998

(84) Designated Contracting States:
AT BE CH CY DE DK ES FI FR GB GR IE IT LI LU
MC NL PT SE

Designated Extension States:
AL LT LV MK RO SI

(30) Priority: 08.09.1998 JP 25363498

(71) Applicant: UNI-CHARM CORPORATION
Kawanoe-ahli Ehime-ken (JP)

(72) Inventor: Mizutani, Satoshi, C/o Technical Center
Mitoyo-gun, Kanagawa-ken 789-1602 (JP)

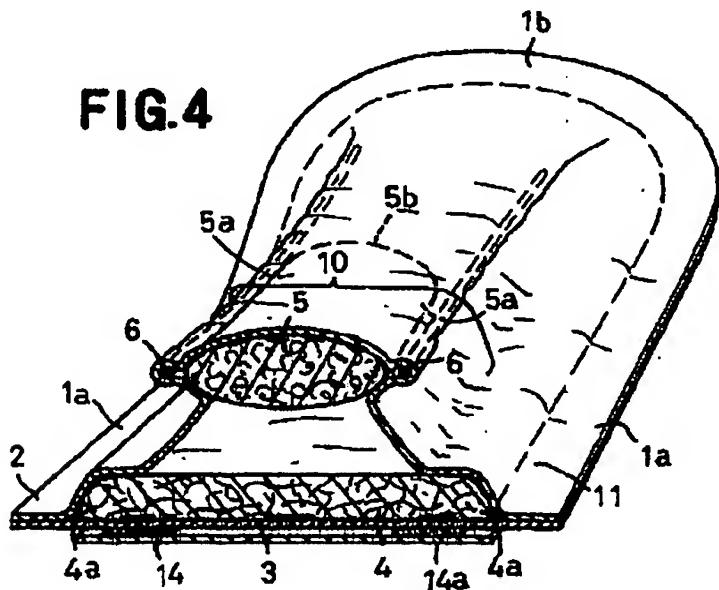
(74) Representative: Parry, Christopher Stephen
Saunders & Doleymore, 8 Rickmansworth Road
Watford, Herts. WD18 0JU (GB)

(54) Sanitary napkin

(57) A sanitary napkin 1 includes a liquid-permeable topsheet 2, a liquid-impermeable backsheet 3 and a liquid-absorbent core 4 disposed therebetween. The topsheet 2 extends to transversely opposite side edges 1a of the napkin 1 with interposition of pleats 10a, along which side edges 1a the topsheet 2 is bonded to the backsheet 3. The core 4 includes a lower absorbent core 6 and an

upper absorbent core 5. The pleats 10a lie between transversely opposite side edges 4a of the lower absorbent core 6 and transversely opposite side edges 5a of the upper absorbent core 5. The topsheet 2 are provided along the opposite side edge of the upper absorbent core 5 with elasticity being effective longitudinally of the napkin 1.

FIG.4



EP 0 985 396 A3



European Patent
Office

EUROPEAN SEARCH REPORT

Application Number
EP 99 30 7134

DOCUMENTS CONSIDERED TO BE RELEVANT			CLASSIFICATION OF THE APPLICATION (HCL7)						
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim							
X	WO 97 39710 A (KIMBERLY CLARK CO) 30 October 1997 (1997-10-30) * page 8, line 7 - line 10; claims; figures *	1-3,5	A61F13/15						
A	EP 0 815 816 A (PROCTER & GAMBLE) 7 January 1998 (1998-01-07) * column 7, line 10 - column 8, line 16; figures *	1,6							
A	PATENT ABSTRACTS OF JAPAN vol. 017, no. 468 (C-1102), 26 August 1993 (1993-08-26) & JP 05 115506 A (UNI CHARM CORP), 14 May 1993 (1993-05-14) * abstract *	1							
P,A	EP 0 908 162 A (UNI CHARM CORP) 14 April 1999 (1999-04-14) * the whole document *	1-6							
P,A	WO 98 58614 A (GUSTAFSSON ANDERS MOELNLYCKE AB (SE)) 30 December 1998 (1998-12-30) * claims; figures *	1,3,5	A61F						
<p>The present search report has been drawn up for all claims</p> <table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 33%;">Place of search</td> <td style="width: 33%;">Date of completion of the search</td> <td style="width: 34%;">Examiner</td> </tr> <tr> <td>THE HAGUE</td> <td>30 October 2001</td> <td>Mirza, A</td> </tr> </table>				Place of search	Date of completion of the search	Examiner	THE HAGUE	30 October 2001	Mirza, A
Place of search	Date of completion of the search	Examiner							
THE HAGUE	30 October 2001	Mirza, A							
CATEGORY OF CITED DOCUMENTS		T : theory or principle underlying the invention E : earlier patent document, but published on, or after the filing date D : document cited in the application L : document cited for other reasons & : member of the same patent family, corresponding document							
X : particularly relevant & taken alone Y : particularly relevant & combined with another document of the same category A : technological background O : non-patent disclosure P : intermediate document									

ANNEX TO THE EUROPEAN SEARCH REPORT
ON EUROPEAN PATENT APPLICATION NO.

EP 99 30 7134

This annex lists the patent family members relating to the patent documents cited in the above-mentioned European search report. The members are as contained in the European Patent Office EDP file on The European Patent Office is in no way liable for these particulars which are merely given for the purpose of information.

30-10-2001

Patent document cited in search report		Publication date		Patent family member(s)	Publication date
WO 9739710	A	30-10-1997	US	5853403 A	29-12-1998
			AU	704958 B2	13-05-1999
			AU	2446697 A	12-11-1997
			BR	9708852 A	13-04-1999
			CA	2250147 A1	30-10-1997
			EP	0901358 A1	17-03-1999
			JP	2000508933 T	18-07-2000
			WO	9739710 A1	30-10-1997
			US	5947947 A	07-09-1999
EP 0815816	A	07-01-1998	EP	0815816 A1	07-01-1998
			AU	726531 B2	09-11-2000
			AU	3221697 A	21-01-1998
			CA	2259398 A1	08-01-1998
			EP	0816322 A1	07-01-1998
			JP	11513919 T	30-11-1999
			WO	9800082 A1	08-01-1998
JP 05115506	A	14-05-1993	JP	2928669 B2	03-08-1999
EP 0908162	A	14-04-1999	JP	11113958 A	27-04-1999
			AU	8833398 A	29-04-1999
			BR	9804175 A	07-12-1999
			CA	2249782 A1	08-04-1999
			CN	1214235 A	21-04-1999
			EP	0908162 A2	14-04-1999
			TW	410599 Y	01-11-2000
			US	6248098 B1	19-06-2001
WO 9858614	A	30-12-1998	SE	509537 C2	08-02-1999
			AU	8051598 A	04-01-1999
			EP	1032339 A1	06-09-2000
			PL	337812 A1	11-09-2000
			SE	9702394 A	25-12-1998
			WO	9858614 A1	30-12-1998
			SK	178899 A3	11-07-2000

EP FORM P049
For more details about this annex : see Official Journal of the European Patent Office, No. 12/82.